DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

E19EA-4
AVCO Lycoming
TIGO-541-B1A, -C1A,
-D1A, -D1B,
-E1A, -G1AD

April 25, 1986

TYPE CERTIFICATE DATA SHEET NO. E19EA

Engines of models described herein conforming with this data sheet (which is a part of Type Certificate No. E19EA) and other approved data on file with the Federal Aviation Administration meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Civil Air Regulations/Federal Aviation Regulations provided they are installed, operated and maintained as prescribed by the approved manufacturer's manuals and other approved instructions.

Type Certificate Holder — AVCO Lycoming Williamsport Division
AVCO Corporation
Williamsport, Pennsylvania 17701

Model Lycoming TIG0-541	-C1A	-D1A	-E1A
Type 6H0A geared drive turbocharged			
Rating	(See NOTE 4)	- -	- -
Maximum continuous r.p.m., in.Hg. at:			
Standard density critical alt. ft.	400-3200-43.5-15,000	450-3200-48.0-15,000	425-3200-47.3-15,000
Standard density sea level alt. ft.	400-3200-43.3-SL	450-3200-46.6-SL	425-3200-45.0-SL
Takeoff (5 min.) , hp., r.p.m., in.Hg. at:			
Standard density critical alt. ft.	400-3200-43.5-15,000	450-3200-48.0-15,000	425-3200-47.3-15,000
Standard density sea level alt. ft.	400-3200-42.3-SL	450-3200-46.6-SL	425-3200-45.0-SL
Fuel (min. grade aviation gasoline)	100/100 LL	- -	- -
Lubrication oil (lubricants should conform to the specification as listed or to subsequent revisions thereto).	Lycoming spec. No. 301-F	- -	- -
Bore and stroke, in.	5.125 x 4.375	- -	- -
Displacement, cu. in.	541.5	- -	- -
Compression Ratio	7.30:1	- -	- -
Weight (dry) lb. (with starter and alternator)	703	706	- -
C.G. location (with starter and alternator installed)			
From front face of prop mounting flange, in	26.68	25.75	26.51
Off crankshaft C.L., in.	0.12 above; 0.01 left	0.61 above; 0.07 right	0.20 above; 0.09 left
Propeller shaft flange	NOTE 8	- -	- -
Crankshaft dampers (torsional)	5-third order & 1 second order	- -	- -
Fuel injection	Bendix RSA-10DB1	- -	Bendix RSA-10DB2
Turbosupercharger-AiResearch model	T-1879 (NOTES 4 & 9)	T18A21 (NOTES 4 & 9)	- -
Ignition, dual	Bendix S6LN-1208, S6RN-1209	- -	- -

"- -" indicates "same as preceding model." "—" indicates "does not apply".

Model Lycoming TIG0-541	-C1A	-D1A	-E1A
Ignition timing °BTC	20	- -	- -
Spark plugs	NOTE 6	- -	- -
Oil sump capacity, qt.	15	18	- -
Usable oil, qt.	(20° nose up, 13° nose down)	(22° nose up,) (24° nose down)	- - - -
	13	9	- -
NOTES	1 through 9	- -	- -

Model Lycoming TIG0-541	-B1A	-G1AD	-DIB
Type 6H0A geared drive turbocharged			
Rating	(See NOTE 4)		
Maximum continuous r.p.m., in.Hg. at:			
Standard density critical alt. ft.	450-3200-48.0-15,000	445-3200-45.3-15,000	420-3200-48.4-15,000
Standard density sea level alt. ft.	450-3200-46.6-SL	450-3200-45.3-S.L.	450-3200-48-4-S.L.
Takeoff (5 min.) , hp., r.p.m., in.Hg. at:			
Standard density critical alt. ft.	450-3200-48.0-15,000	445-3200-43.3-15,000	420-3200-48.4-15,000
Standard density sea level alt. ft.	450-3200-46.6-SL	450-3200-45.3-S.L.	450-3200-48.4-S.L.
Fuel (min. grade aviation gasoline)	100/100/LL	- -	- -
Lubrication oil (lubricants should conform to the specification as listed or to subsequent revisions thereto).	Lycoming specification	- - No. 301-F	- -
Bore and stroke, in.	5.125 x 4.375	- -	- -
Displacement, cu. in.	541.5	- -	- -
Compression Ratio	7.30:1	- -	- -
Weight (dry) lb. (with starter and alternator)	663 (starter only)	714	710
C.G. location (with starter and alternator installed)			
From front face of prop mounting flange, in	27.56	25.65	27.12
Off crankshaft C.L., in.	0.25 above; 0.63 left	0.78 above; 0.15 right	0.21 above, 0;0.50 left
Propeller shaft flange	NOTE 8	- -	- -
Crankshaft dampers (torsional)	5-third order & 1-second order	- -	- -
Fuel injection	RSA-10DB1	Bendix RSA-10AA1	Bendix RSA-10DB2
Turbosupercharger-AiResearch model	T1879 (NOTES 4 & 9)	T18A21 (NOTES 4 & 9)	T18A51
Ignition, dual	Bendix RSA-10DB1	Bendix D6RN-2230	Bendix S6LN-1208, S6RN-1209
Ignition timing °BTC	20	- -	- -
Spark plugs	NOTE 6	- -	- -
Oil sump capacity, qt.	23	14	
Usable oil, qt.	(20° nose up or down) 19.5	(18° nose up, 10° nose down (5)	22° nose up, 24° nose down) (9) (See NOTE 10)
NOTES	1 through 8	1 through 9	1 through 10

"- -" indicates "same as preceding model." "—" indicates "does not apply".

Certification basis:

Regulations & Amendments	Model	Date of Application	Date Type Certificate E19EA issued/revised.
FAR-33, 33-1, 33-2, 33-3 effective February 1, 1965	TIG0-541-C1A	February 29, 1968	November 19, 1968
	TIG0-541-D1A	October 30, 1968	June 26, 1969
	TIG0-541-E1A	June 23, 1969	June 26, 1969
	TIG0-541-B1A	September 12, 1968	February 12, 1970
	TIG0-541-G1AD	October 6, 1971	May 1, 1975
	TIG0-541-DIB	June 17, 1976	December 3, 1976

Production basis: Production Certificate No. 3.

NOTE 1. Maximum permissible temperatures:

Models	-C1A	-D1A, -E1A	-B1A	-G1AD	-DIB
Cylinder Head	475°F	- -	- -	- -	- -
Cylinder Base	NOTES 5	- -	- -	- -	- -
Oil inlet	245°F	- -	- -	- -	- -
Fuel injector inlet air	400°F	- -	- -	- -	- -
Exhaust gas (turbo inlet) at location shown on	1650°F	- -	- -	- -	- -
Lycoming Dwg. Nos.	63270	63303	63301	63435	63468
Compressor temperature rise	340°F	- -	- -	- -	- -

NOTE 2. Pressure limits:

	Minimum	Maximum	Idle (min)	Injector in Idle cut off
Fuel pressure limits (above Fuel injector inlet air pressure) at inlet to fuel Injector				
All models except - DIB	29 p.s.i.	55 p.s.i.	12 p.s.i.	—
-DIB	29 p.s.i.	65 p.s.i.	12 p.s.i.	—
Fuel - pressure limits at inlet to engine fuel pump				
-B1A	—	—	—	—
-C1A, -D1A, -D1B, -E1A, -G1AD	-2 p.s.i.	65 p.s.i.	—	55 p.s.i.
Oil pressure limits:	55 p.s.i.	90 p.s.i.	10 p.s.i.	—
Starting and warm up	—	100 p.s.i.	—	—
To torquemeter	—	325 p.s.i.	—	—
Air pressure at fuel injector inlet				
-C1A	—	45.5 in. Hg.	—	—
-D1A	—	50.0 in. Hg.	—	—
-E1A	—	49.2 in. Hg.	—	—
-B1A	—	50.0 in. Hg.	—	—
-G1AD	—	46.3 in. Hg.	—	—
Manifold pressure (cumulative total with altitude adjustment)				
-C1A		45.0 in. Hg.		
-D1A		49.5 in. Hg.		
-E1A		48.7 in. Hg.		
-B1A		49.5 in. Hg.		
-G1AD		45.8 in. Hg.		
-D1B		48.9 in. Hg.		
Exhaust back pressure		0.5 in. Hg.		

NOTE 3. The following accessory provisions are available:

Accessory Drives	-B1A	-C1A, -D1A, -D1B, -E1A, -G1AD	Rotation Facing Drive Pad	Speed Ratio to Crankshaft	Maximum Torque (in.-lb.) Continuous	Static	Maximum Overhang Moment (in.-lb.)
Alternator	-	*					
Generator	*	—	C	2.800:1	500	2200	400
Tachometer	*	*	CC	0.500:1	7	50	10
Propeller Governor	*	*	CC	0.800:1	125	1500	25
Freon Compressor	*	*	C	1.000:1***	Belt limited		100
Dual drives: (opposite ends of common shaft)							
Vacuum or Hydraulic Pump	*	*	C	1.000:1			50
Hydraulic or Vacuum Pump	*	*	CC	1.000:1	200 total	1600 total	50

"C" - Clockwise, "CC" - Counter clockwise
*Standard, **Optional, ***with drive pulley diameter of 6.00 in.

NOTE 4. These engines are equipped with integral mounted AiResearch turbochargers as shown on AVCO Lycoming drawing numbers indicated:

Engine Model	Turbocharger	Drawing Nos.
-B1A	T1879	63301
-C1A	T1879	63270
-D1A & -E1A	T18A21	63303
-G1AD	T18A21	63435
-D1B	T18A51	63468

Performance data for these engines are presented on Lycoming Curve Nos. as tabulated.

Engine Models	Curve No.
-B1A	13082
-C1A	13034A
-D1A	13082
-E1A	13152
-G1AD	13211
-D1B	13321-A

These turbochargers meet the containment requirements of FAR 33 and do not require external protection.

NOTE 5. Cylinder base temperature limits are not applicable to engine models which incorporate internal piston cooling oil jets.

NOTE 6. Spark plugs approved for use on these engines are listed in the latest revision of AVCO Lycoming Service Instruction No. 1042.

NOTE 7. Description

TIG0-541-C1A-Basic model. Six cylinder air cold, horizontally-opposed, geared drive, fuel, injected, top induction, down exhaust, turbocharged engine incorporating internal piston cooling oil jets, side mounted accessory drives and a single oil supply from prop. gov. Provision is also made for installation of reverse pitch propeller control.

NOTE 7., cont.

-D1A - Similar to the -C1A except has higher power rating and uses a different turbocharger with provisions for cabin bleed air.

-E1A - Similar to the -D1A except has lower power rating with different turbocharger spring rate and variable absolute pressure controller.

-B1A - Similar to the -C1A except has higher power rating and does not incorporate provisions for cabin bleed air.

-G1AD - Similar to the -D1A except incorporates an intercooler, dual magneto and a fuel injector employing fuel head enrichment.

-D1B - Similar to -D1A except has an integral wastegate turbocharger with revised exhaust system and incorporates low drag cylinders.

NOTE 8. The propeller shaft has a 2:3 ratio to crankshaft rotation and is positioned 4.92 in. above crankshaft centerline. Propeller rotation is counter clockwise and crankshaft rotation clockwise as viewed form the engine anti-propeller end. Propeller shaft provides a 5 1/4 in. O.D. flange with a 4.25 in. dia. bolt circle.

NOTE 9. Air from the compressor of the AiResearch models T-1879 and T18A21 turbochargers is suitable for cabin pressurization. The installation must provide for cabin air temperature control from 300°F to temperature at 20,000 feet (hot day conditions - maximum engine power). For cabin air inlet flange dimensions see AVCO Lycoming Dwg. No. 63270 for -C1A, No. 63303 for -D1A and E1A, No. 63435 for -G1AD, No. 63468 for -D1B.

A sonic nozzle must be provided to preclude affecting engine performance by cabin air bleed.

NOTE 10. With maximum oil temperature, the maximum nose up is 17° and the maximum nose down is 15°.

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